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ORGANIZED PLANNING OF SCIENTIFIC RESEARCH
IN POLISH INDUSTRIAL INSTITUTES

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(Polish Editors' Note: The editors have published the following article as an invitation to discussions, and ask workers in scientific research institutes and representatives of the economic administration for their comments on matters raised in this article. The editors particularly ask that these comments especially note those statements of the author which arose doubt. For instance, should the distribution of labor input be determined after the guiding principles are prepared; or, at this stage, should only the total of man-hours be indicated, and should calculation of labor input be made for the annual plan?

Is it feasible for the scientific council to sit in at every stage of a project when the council meets two to four times a year? Is the existence of a single executive section possible in multi-laboratory institutes dealing with a wide range of problems or would it be better to form smaller executive offices in each specialized field of the institute, so that the author could maintain constant supervision over work progress in his field? Is it feasible to maintain project records which show labor input and results achieved at the operations level, or should scientific researchers only fill out project cards which distribute costs according to individual projects while the results of research are noted in a memorandum book? What are the possibilities of reducing red tape burdening scientific research workers?)

The vigorous development of scientific research in Poland resulting from the constantly increasing level of technology and the existence of an atmosphere conducive to extensive research work is beginning to necessitate standardization and streamlining of certain basic organizational principles. The aims of these principles should be the following:

1. To link scientific research to the present needs of industry as well as to the long-range perspectives of industrial development.

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2. To control and influence the progress of the approved scientific research plan.

3. To provide documentary support for decisions adopted (for example, the transition from laboratory experiments to pilot plant production, from the pilot plant to industrial-scale production, etc.).

4. To provide for the verification of results.

5. To promote productivity and effectiveness in the work of the executive personnel.

6. To gather the most essential elements for calculating the costs of individual research projects.

The present directives and regulations of the PKPG (Panstwowa Komisja Planowania Gospodarczego, State Economic Planning Commission) and of the industrial ministries only partially resolved these problems. They merely provide for reports from subordinate institutes and do not solve the whole problem.

The individual institutes independently have been seeking solutions within their own fields, and undoubtedly have had some results. Many ideas presented herein may have been put to a practical test and further discussion should be fruitful.

The basis for the work of the institute, and at the same time the factor binding its activities to all other economic tasks of the state, is the long-term and annual scientific research plan. This plan is closely tied to the needs of industry and is part of a broader plan for technical development worked out by industry. It also covers problems which the industrial administration is not equipped to solve on its own. The plan and the designation of the field of research should be initiated by the industry on a printed form which might be headed, "Proposed Scientific Research Projects of the CZP (Centralny Zarzad Przemyslu, Central Industrial Administration)." This form should include, in addition to details on the subject matter, data on the extent of application of the results as well as data on the economic and production effects which industry expects to result from work on the projects it has proposed. Such a description of the subject will provide the necessary information for determining research priorities.

Such a form, based on present PKPG terminology and symbols, would look like this:

<u>Number</u>	<u>Problem</u>	<u>Purpose</u>	<u>Subject</u>	<u>Degree of Application</u>	<u>Economic Effects Anticipated</u>
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The form submitted to the institute and to the ministry would be the point of departure for the institute's proposals, which would be drawn up in the same manner.

It may be said, on the basis of past experience, that the proposals of industry usually will be concerned with a narrow approach to its most vital and immediate needs, while those of the institute will tend toward the theoretical and long-range aspect with a broad application.

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A penetrating, carefully thought out, logical synthesis of both proposals should intimately tie the future work of the institute to the current needs of industry, without limiting the scope of research or obstructing creative thought, which at times runs ahead of the immediate needs.

A joint conference of the administrations of industry and the institute should develop this synthesis, with the ministry acting as arbiter. The minutes of this conference will constitute the basis for drawing up the "Scientific Research Plan of the Institute," which is the plan approved by the ministry.

Upon receipt of the approved "Scientific Research Plan of the Institute," the planning section of the institute sends portions of the plan, signed by the general director and his deputy for scientific matters, to the respective specialized laboratories. The manager of the laboratory, after familiarizing himself with the portion of the plan he has received, summons the chief engineers who work on the subject contained in the plan. The functions of the engineers will be discussed below. When necessary, the scientific research project (usually a small subdivision of the project) is subcontracted to other laboratories in the institute, with prior consent of the director of scientific research. The subcontracted projects are accurately defined in writing and countersigned by the deputy director for scientific matters. The institute management may also subcontract certain research work to factories and factory laboratories, especially for testing at the pilot plant stage, or for full industrial application. In this case, the institute forwards documented recommendations and proposals for the subcontracted work in the ministry, which approves them and transmits them to the factory.

When the factory management receives the subcontracted project, researchers are assigned to do the work in accordance with regulations and instructions for conducting and documenting scientific research which are in force in the institute.

The chief engineer of the project is the scientific researcher responsible for the results, progress, and punctual completion of the project in all its three stages -- laboratory, pilot plant, and industrial. He coordinates the results obtained by individual workers in his own laboratory and in other units, laboratories, and factories working on the assignment.

The chief engineer, after acquainting himself with the subject and its literature, draws up "Guiding Principles for the Project." These are discussed with his superiors, who give their approval in written form.

The "Guiding Principles for the Project" include:

1. Methods of procedure -- possible variables to be tested, sequence, and methods of research.
2. List of equipment and specifications for carrying out the research.
3. Requirements for equipment, materials, and literature which the laboratory does not possess but which are absolutely essential.

After approval of the guiding principles, the chief engineer draws up a work-load chart, which he submits for approval. The details of the chart are based on the guiding principles and include a schedule of the progress and completion of individual assignments and of the complete project, and labor input for individual assignments and the entire project expressed in terms of man-hours. With the consent of the management, the guiding principles and the work-load chart can be drawn up piecemeal at each stage of the project.

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Upon completion of each stage, the chief engineer submits to the laboratory manager a written report entitled "Project Progress Report." He also includes concrete recommendations on further research prospects. The decision of the director of scientific research, after he has heard the views of the scientific council, may be the basis for proceeding with the project in its next stages -- pilot plant or industrial.

During the course of the project, the manager of the laboratory is kept informed of its progress by the chief engineer with the aid of periodic Gantt progress charts. A collated Gantt chart for the entire project serves as the basis for a report to the higher authorities of the institute.

The chief engineer of the project keeps a "Journal of Research Work" for all the work he directs. This journal serves as the basis for preparing Gantt progress charts and for the "Report of Results."

After positive results have been obtained in all stages of work on the project, the scientific council, on the recommendation of the director of scientific research, transmits the results to the executive section of the institute for application in industrial operation. Upon consent of the higher authorities, the work is published.

The pilot plant is the link between the institute and industry. The pilot plant cooperates closely with the industrial administration in the final stage of the project: testing results under industrial operating conditions. With specifications furnished by the industrial branch laboratory, covering the technology, equipment, raw materials, and the finished product, as well as a plan of quality control, the pilot plant assists in working out plans for new investments or for the adaptations of existing plant facilities. The pilot plant prepares the technical part of the report to the KOPI [not identified]. It is the official consultant to the board or management on construction. It cooperates in organizing the activation of production, and takes part in training and educating technical personnel to handle the new production. When necessary, the pilot plant calls on the scientific researchers who worked on the project.

After activation and a transition to planned production, the pilot plant turns over the technical documents in protocol form to the factory administration, which from now on assumes the responsibility for production.

The principles of organization above enumerated primarily concern the institute administration. It is also essential to have a precise definition of organization on the working level of the scientific researcher. This is essential for the maximum accuracy of the results, for their proper collation, and for a steady increase in research efficiency.

The research should be conducted along the following principles. Every scientific researcher working directly on various elements of scientific research keeps a memorandum notebook. This is the basic document of all the work. It is a notebook with numbered pages in which the researcher notes, with a carbon copy, the weights, measurements, observations, and all pertinent calculations.

The memorandum notebook is issued by the director of the plant or laboratory in exchange for a receipt and after an appropriate entry in the records. An entry in the notebook includes the date, hour, and symbol for the job or number of the sample. The notebook and carbon copies of the entries are confidential documents. At the end of each day, the carbon copies of the notebook are given to the director of the laboratory for filing.

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Every researcher maintains a project record, in which methodical tracts from the notebook summarize the daily results. The project record is used in calculating the man-hour input for various types of work, and provides statistical material for comparison with future standards of efficiency.

The researcher keeps a record of all his work in the project record regardless of whether it includes a numerical result or whether it involves research. The record must include time spent on collection of literature, shop layout, installation of equipment, design of the experiment, blueprints of original equipment, and workshop consultations. The researcher also keeps a record of the time spent on all other work assigned by his superior. When entering numerical results in the project record, reference is made to the page number of the original entry in the notebook.

The manager of the plant or laboratory verifies regularly, at least once a week, the project record of the researcher and signs it. The project record is a confidential document.

The following is a typical heading for the project record:

Entry Number	Date	Symbol of Project	Brief Description of Activity	Results Achieved	Page Reference in Notebook	Length of Time Worked
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On the basis of project records, the manager of the plant or laboratory prepares for the planning or accounting section a periodic collated report on the time spent by researchers on actual research work, on organizational or administrative problems, or on other duties required. The preparation of such a report does not entail much work, but the data obtained will be very valuable analytical material, reflecting the efficiency of the organization and the feasibility of employing scientific researchers. These data can be a valuable element in the calculation of costs for various projects.

The chief engineer for the project maintains the "Journal of Research Work," which consists of methodical entries in chronological order of results obtained, with page references to the respective notebooks. This provides a ready insight into the progress of the work and constitutes the basis for the Gantt chart mentioned previously. The "Journal of Research Work" makes it possible to collate results quickly and accurately and present them in the form of a work progress report.

The manager of the plant or the scientific research director of the institute keeps a record of his recommendations in the journal.

The following is a suggested heading for the "Journal of Research Work":

Entry Number	Date Entry	Short Description of Work and Results Obtained	Page References to Notebook	Recommendations of Superior Officer
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The organizational measures proposed here do not seem to involve "red tape" nor do they overburden the scientific researcher with useless paper work. The system would insure the realization of the goals presented in the introduction with a minimum of time and work.

While this article does not completely exhaust the subject, it is an attempt to standardize the organizational work in institutes, and preclude individual discretion and its harmful consequences.

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